

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Canceled)
2. (Currently amended) The method of claim 1 8, wherein the copying further comprises:
fetching the metadata from the host memory to the adapter memory, using at least one criterion to anticipate the requirement for protocol processing of the metadata by the protocol processor.
3. (Currently amended) The method of claim 1 8, wherein the metadata is stored in a protocol control block of a transport protocol, ~~and~~ wherein the protocol control block indicates a state of a session handled by the protocol processor, wherein the protocol processor reduces requirements for the adapter memory by utilizing the host memory to store the metadata, and wherein the metadata is prefetched in anticipation of the requirement for protocol processing of the metadata by the protocol processor.
4. (Currently amended) The method of claim 1 8, further comprising:
maintaining a data structure to indicate sessions capable of processing requests;
receiving, by the protocol processor, a request for sending a packet; and
copying the metadata from the host memory to the adapter memory, in response to determining based at least in part upon the data structure that the request can be associated with a session that is capable of processing the request.
5. (Currently amended) The method of claim 1 8, further comprising:
maintaining a data structure to indicate sessions capable of processing requests;
receiving, by the protocol processor, a request for sending a packet;
determining from the data structure whether the request can be associated with a session that is capable of processing the request; and

queuing the request for later processing, in response to determining that the request cannot be associated with any session that is capable of processing the request.

6. (Currently amended) ~~The method of claim 1, further comprising:~~ A method, comprising:

allocating, by a protocol processor, metadata related to a packet in a host memory, wherein the host memory is comprised in a host that is coupled to a network adapter that includes the protocol processor;

copying, by the protocol processor, the metadata from the host memory to an adapter memory associated with the network adapter in anticipation of a requirement for protocol processing of the metadata by the protocol processor;

maintaining a delayed acknowledgment timer, wherein the delayed acknowledgment timer is associated with a session;

determining whether the delayed acknowledgment timer is likely to expire in a period of time, wherein the copying of the metadata from the host memory to the adapter memory is performed in response to determining that the delayed acknowledgment timer is likely to expire in the period of time; and

processing, by the protocol processor, the copied metadata.

7. (Currently amended) The method of claim 3 ~~6~~, wherein the network adapter is an offload engine adapter, and wherein the host memory is larger in size than the adapter memory.

8. (Currently amended) ~~The method of claim 1,~~ A method, comprising:
allocating, by a protocol processor, metadata related to a packet in a host memory, wherein the host memory is comprised in a host that is coupled to a network adapter that includes the protocol processor, wherein the protocol processor is implemented in hardware or software, and wherein the network adapter is included in a chip set that includes a central processing unit of the host;

copying, by the protocol processor, the metadata from the host memory to an adapter memory associated with the network adapter in anticipation of a requirement for protocol processing of the metadata by the protocol processor; and

processing, by the protocol processor, the copied metadata.

9. (Canceled)

10. (Currently amended) The network adapter of claim 9 16, wherein copying the metadata further comprises:

fetching the metadata from the host memory to the adapter memory, using at least one criterion to anticipate the requirement for protocol processing of the metadata by the protocol processor.

11. (Currently amended) The network adapter of claim 9 16, wherein the metadata is stored in a protocol control block of a transport protocol, ~~and~~ wherein the protocol control block indicates a state of a session handled by the protocol processor, wherein the protocol processor reduces requirements for the adapter memory by utilizing the host memory to store the metadata, and wherein the metadata is prefetched in anticipation of the requirement for protocol processing of the metadata by the protocol processor.

12. (Currently amended) The network adapter of claim 9 16, wherein the protocol processor is further capable of:

maintaining a data structure to indicate sessions capable of processing requests;

receiving a request for sending a packet; and

copying the metadata from the host memory to the adapter memory, in response to determining based at least in part upon the data structure that the request can be associated with a session that is capable of processing the request.

13. (Currently amended) The network adapter of claim 9 16, wherein the protocol processor is further capable of:

maintaining a data structure to indicate sessions capable of processing requests;

receiving a request for sending a packet; and

determining from the data structure whether the request can be associated with a session that is capable of processing the request; and

queuing the request for later processing in response to determining that the request cannot be associated with any session that is capable of processing the request.

14. (Currently amended) ~~The network adapter of claim 9~~ A network adapter, wherein the network adapter is capable of being coupled to a host having a host memory, the network adapter comprising:

an adapter memory associated with the network adapter; and
a protocol processor, wherein the protocol processor is capable of allocating metadata related to a packet in the host memory, copying the metadata from the host memory to the adapter memory in anticipation of a requirement for protocol processing of the metadata by the protocol processor, and processing the copied metadata, wherein the protocol processor is further capable of:

maintaining a delayed acknowledgment timer, wherein the delayed acknowledgment timer is associated with a session; and

determining whether the delayed acknowledgment timer is likely to expire in a period of time, wherein the copying of the metadata from the host memory to the adapter memory is performed in response to determining that the delayed acknowledgment timer is likely to expire in the period of time.

15. (Currently amended) The network adapter of claim ~~11~~ 14, wherein the network adapter is an offload engine adapter, and wherein the host memory is larger in size than the adapter memory.

16. (Currently amended) ~~The network adapter of claim 9~~ A network adapter, wherein the network adapter is capable of being coupled to a host having a host memory, the network adapter comprising:

an adapter memory associated with the network adapter; and
a protocol processor, wherein the protocol processor is capable of allocating metadata related to a packet in the host memory, copying the metadata from the host memory to the adapter memory in anticipation of a requirement for protocol processing of the metadata by the protocol processor, and processing the copied metadata, wherein the protocol processor is

implemented in hardware or software, and wherein the network adapter is included in a chip set that includes a central processing unit of the host.

17. (Canceled)

18. (Canceled)

19. (Currently amended) ~~The system of claim 17, further comprising:~~ A system in communication with data storage, comprising:

a host;

a data storage controller to manage Input/Output (I/O) access to the data storage, wherein the data storage controller is coupled to the host;

a network adapter coupled to the host;

a host memory coupled to the host;

an adapter memory associated with to the network adapter;

a protocol processor included in the network adapter, wherein the protocol processor is capable of allocating metadata related to a packet in the host memory, copying the metadata from the host memory to the adapter memory in anticipation of a requirement for protocol processing of the metadata by the protocol processor, and processing the copied metadata; and

a data structure to indicate sessions capable of processing requests, wherein the protocol processor is capable of receiving a request for sending a packet, and wherein the protocol processor is capable of copying the metadata from the host memory to the adapter memory, in response to determining based at least in part upon the data structure that the request can be associated with a session that is capable of processing the request, wherein the protocol processor reduces requirements for the adapter memory by utilizing the host memory to store the metadata, and wherein the metadata is prefetched in anticipation of the requirement for protocol processing of the metadata by the protocol processor, wherein the protocol processor is further capable of maintaining a delayed acknowledgment timer, wherein the delayed acknowledgment timer is associated with a session and determining whether the delayed acknowledgment timer is likely to expire in a period of time, and wherein the copying of the metadata from the host

memory to the adapter memory is performed in response to determining that the delayed acknowledgment timer is likely to expire in the period of time.

20. (Canceled)

21. (Currently amended) The article of manufacture of claim ~~20~~ 27, wherein the copying further comprises:

fetching the metadata from the host memory to the adapter memory, using at least one criterion to anticipate the requirement for protocol processing of the metadata by the protocol processor.

22. (Currently amended) The article of manufacture of claim ~~20~~ 27, wherein the metadata is stored in a protocol control block of a transport protocol, ~~and~~ wherein the protocol control block indicates a state of a session handled by the protocol processor, wherein the protocol processor reduces requirements for the adapter memory by utilizing the host memory to store the metadata, and wherein the metadata is prefetched in anticipation of the requirement for protocol processing of the metadata by the protocol processor.

23. (Currently amended) The article of manufacture of claim ~~20~~ 27, wherein the instructions when executed further results in the following:

maintaining a data structure to indicate sessions capable of processing requests;
receiving, by the protocol processor, a request for sending a packet; and
copying the metadata from the host memory to the adapter memory, in response to determining based at least in part upon the data structure that the request can be associated with a session that is capable of processing the request.

24. (Currently amended) The article of manufacture of claim ~~20~~ 27, wherein the instructions when executed further result in the following:

maintaining a data structure to indicate sessions capable of processing requests;
receiving, by the protocol processor, a request for sending a packet;

determining from the data structure whether the request can be associated with a session that is capable of processing the request; and

queuing the request for later processing in response to determining that the request cannot be associated with any session that is capable of processing the request.

25. (Currently amended) ~~The article of manufacture of claim 20, wherein the instructions when executed further result in the following:~~ An article of manufacture, comprising a storage medium having stored therein instructions that when executed by a machine results in the following:

allocating, by a protocol processor, metadata related to a packet in a host memory, wherein the host memory is comprised in a host that is coupled to a network adapter that includes the protocol processor;

copying, by the protocol processor, the metadata from the host memory to an adapter memory that is associated with the network adapter in anticipation of a requirement for protocol processing of the metadata by the protocol processor;

maintaining a delayed acknowledgment timer, wherein the delayed acknowledgment timer is associated with a session;

determining whether the delayed acknowledgment timer is likely to expire in a period of time, wherein the copying of the metadata from the host memory to the adapter memory is performed in response to determining that the delayed acknowledgment timer is likely to expire in the period of time; and

processing, by the protocol processor, the copied metadata.

26. (Currently amended) The article of manufacture of claim ~~22~~ 25, wherein the network adapter is an offload engine adapter, and wherein the host memory is larger in size than the adapter memory.

27. (Currently amended) ~~The article of manufacture of claim 20~~ An article of manufacture, comprising a storage medium having stored therein instructions that when executed by a machine results in the following:

allocating, by a protocol processor, metadata related to a packet in a host memory,
wherein the host memory is comprised in a host that is coupled to a network adapter that
includes the protocol processor, wherein the protocol processor is implemented in hardware or
software, and wherein the network adapter is included in a chip set that includes a central
processing unit of the host;

copying, by the protocol processor, the metadata from the host memory to an adapter
memory that is associated with the network adapter in anticipation of a requirement for protocol
processing of the metadata by the protocol processor; and
processing, by the protocol processor, the copied metadata.